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# THE SAFE USE OF ELECTRICITY IN MARYLAND HOMES

ELECTRICAL TERMS

by

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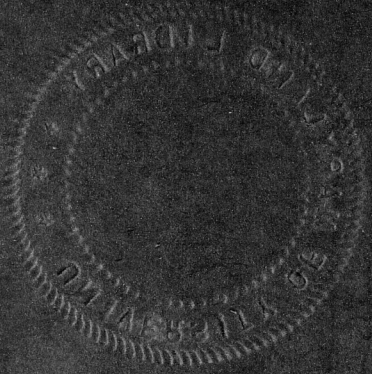


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DO NOT CIRCULATE

# THE SAFE USE OF ELECTRICITY

## ELECTRICAL TERMS

By Albert V. Krewatch

Electricity, when used with "approved" equipment connected to adequate and properly constructed circuits which are well arranged and maintained, is the safest, most convenient known source of light, heat and power. It is made unsafe only by carelessness, injury or lack of repairs to the circuits, or by use of inferior or poorly made materials, perhaps improperly put together. Using fuses of proper size helps protect the wiring and equipment from part of the danger of overloaded circuits or from the use of worn, frayed cords.

It is the purpose of this circular to help the reader recognize unsafe electrical practices and to suggest safe ways of handling and using electricity.

### Safety Suggestions

1. Fuses are frequently burned out by connecting too many appliances and lights to a single line. This overloads the wiring beyond its capacity and if the fuse is too large (permitting too much current to flow), it will fail to break the current at the danger point. The wires will overheat and cause trouble. If fuse after fuse keeps burning out you are tempted to replace it with a larger one or a substitute. You should not because a fuse is the safety valve of a good wiring system.

2. When renewing fuses in a "live" or "hot" circuit, if possible, first pull the switch ahead of the fuse. If not possible, use one hand only and always stand on a dry board or other insulating material. Do not attempt to replace fuses in the dark, put the fingers into the fuse socket, or touch the fuse clips.

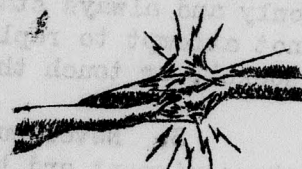
3. Never put a penny back of a blown fuse. It may damage both the equipment and house wiring.

4. Never use fuses which have ratings higher than the current capacity of the wire and never resort to fuse substitutes. Protection against a fire hazard ceases if the fuse does not burn out when an overload or short circuit occurs. Normally you should not use larger than a 15 ampere fuse. (See Table on page 6).





5. Lamp sockets or overhead fixtures should not be used to supply electric irons or other appliances. Fixture wiring is usually designed to handle 200 or 300 watts. Sockets are designed to control incandescent lamps seldom in excess of 200 watts. Irons and appliances use 500 to 1000 watts and will soon destroy the switch mechanism in the socket, overheat it, overheat the small wire and damage or destroy one or both. Electricity is wasted and usually the appliance functions unsatisfactorily because of voltage loss in the small wire of the fixture. Provide conveniently located outlets with proper size wire for appliances.
6. When using the trouble lamp, never allow the hands or fingers to touch bare contacts. Keep them on the insulated wire.
7. Never allow the body to become a part of an electric circuit; that is, from hand to hand or from hand or head to the feet. The current tends to flow from one wire to another or to ground. Insulate yourself from possible paths.
8. Always remember that moisture aids the flow of electricity. A dry board is a good insulator - a wet board is not.
9. Never do repair work on a "live" circuit. Disconnect cords and appliances from outlets before working on them. Always consider a circuit "live" until you have "killed" it yourself by opening the switch and removing the fuses.
10. Never work with an electric circuit or cord when standing on wet ground, wet floors, or when in water. Never handle electrical equipment with wet hands.
11. In bathrooms, laundries and other places likely to be damp, only porcelain or molded composition electric sockets should be used and extension cords should have a water proof covering.
12. Never touch any lamp, appliance or extension cord when in the bath tub or standing in water.
13. Never run cords under rugs, in door jams or in places where they are subject to wear or injury. Where the insulation of wires has been worn or broken, a short circuit is likely to occur.
14. Avoid exposed wires and ends of wires not connected. Always tape them well. Fallen or exposed wires should always be considered "live" until they are definitely known to be "dead."



15. Radios should be disconnected before working on them. Outdoor radio aerials should be placed away from power wires. Never attempt repairs on an aerial that has fallen against power wires - it is probably "live." Call your electric power company.
16. Never run common extension cords over steam or water pipes. The heat and moisture will break down the insulating material.
17. Do not use extension and drop cords where permanent wiring should be used. Cords hanging on nails, hooks, etc. constitute a serious fire hazard. It is false economy and usually hazardous to install a drop light and then use double or triple sockets and extension cords.
18. Never leave electrically heated appliances connected, when not in use. This is a frequent cause of fires. Occasionally, lightning may damage the appliance.
19. Never use electric wiring or equipment for playful experimenting or practical joking.
20. Do not remove a plug cap from an outlet by pulling or jerking on the cord, grasp the cap itself.
21. If an electric shock is received from an appliance or motor, the cause should be determined at once and remedied.
22. The frames of all motors and appliances of 220 to 240 volts should be permanently and effectively grounded.
23. Keep on hand a supply of lamps and fuses of proper sizes.
24. When leaving the house for an extended period, it is well to open the main switch.
25. All electric wiring should be done by approved methods using approved materials. All wiring should be inspected by a qualified electrical inspector.
26. If the power goes off and stays off for an appreciable length of time it is well to call the power company and tell them. They may not know there is trouble on the line or that a local transformer fuse has blown unless you tell them.



## Definition of Electrical Terms

It will be convenient for one to add to his store of electrical information if he is sufficiently familiar with the common terms as associated with ordinary uses of electricity, so that he may discuss them freely with other persons.

**Ampere** - (Abbreviated amp.) is the unit of rate of flow of electric current, like gallons per minute used to express the rate of flow of water in a water system. Used in sizing fuses and switches and determining proper size wire.

**Volt** - A measure of electric pressure. The electrical force which will cause one ampere to flow against a resistance of one ohm. House circuits are usually 115 and 230 volts. Large appliances and motors usually use 230 volts. Lamps and small appliances use 115 volts.

**Watt** - One watt represents the amount of power of a circuit when the current in that circuit is one ampere and the electric pressure is one volt. (Watts = volts times amperes)

**Kilowatt** - One thousand watts. A one horsepower motor usually uses one kilowatt of electric power.

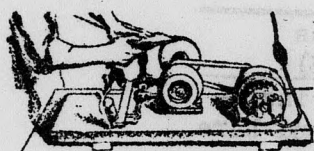


**Kilowatt-hour** - (Abbreviated kw.-hr.). The unit of work or energy, is the result of 1 kilowatt of power acting for one hour.

**Service Wires** - Service is a term used by the electrician to indicate the wires that carry the energy from the transformer to the entrance switch or meter panel of the home.

**Service Switch** - A two- or three-pole switch located in the service lines, normally just ahead of the meter. It should be so connected that the blades are dead when the switch is open. The fuses are placed on the blade side so that they also are dead when the switch is open. It is advisable to use at least 60 ampere switches on the average farm installation. If the electric load is likely to be large, a larger service switch should be used. The neutral wire is usually not fused.

**Fuse** - A protective device consisting of a fireproof chamber and fusible metal link. The link melts when the current exceeds the value for which it was designed.



Temperature Relay - A device that works very much the same as an over-current relay. It is so constructed that it takes time for the excess current to warm up the heating device and open the circuit. They are used to protect motors which require an over-current for a short time when starting, but which will be damaged if the over-current persists. A new type of fuse using the above principle is now on the market for small motors.

Thermal Cut-Out - Thermal cut-outs or thermal breakers are often used in place of fuses. These small automatic circuit breakers will not operate on momentary overloads. In case the switch opens automatically as a result of overload or ~~damage~~, repairs should be made or the faulty appliance removed from the circuit before the switch is closed.

Single Pole Switch - A switch that opens only one side of an electric circuit. It should be placed in an unidentified wire. (Black insulation.)

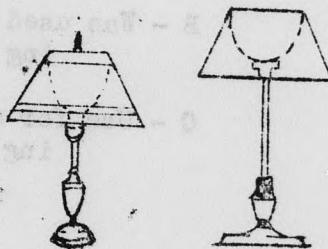
Double Pole Switch - A switch that opens both sides of an electric circuit.

Three-Way Switch - A switch with three binding posts, the contact arm of which is connected to one and free to make contact with either of the other two. The three-way switch is used where it is desired to control a circuit from two stations.

Four-Way Switch - A four-way switch is used between two three-way switches where it is desired to control a circuit from three points.

I. E. S. Lamp - A lamp that has been recommended and built according to the specifications of the Illuminating Engineering Society.

Electrical Inspection - Electrical wiring in most of the State of Maryland must have the approval of a state inspector or other authorized person before being connected to the supply circuit. Inspection protects against unsafe and hazardous wiring. It is of greatest benefit to the owner of the property.



National Electrical Code - A set of rules adopted by the American Standards Association. It constitutes the regulations of the National Board of Fire Underwriters for electric wiring and is frequently specified as a guide by which wiring shall be done. Any one doing electrical wiring should be familiar with this code.

TABLE I. ALLOWABLE CARRYING CAPACITIES OF THE  
COMMONLY USED COPPER CONDUCTORS  
(B. & S. Gage)

| Gage No. | Carrying Capacity in Amperes            |                                                       |                                                                  |
|----------|-----------------------------------------|-------------------------------------------------------|------------------------------------------------------------------|
|          | (1)<br>Rubber<br>insulation:<br>amperes | (2)<br>Varnished<br>cambric<br>insulation:<br>amperes | (3)<br>Other insul-<br>ation and bare<br>conductors:<br>amperes: |
| A - (18) | 3                                       | 4                                                     | 5                                                                |
| (16)     | 6                                       | 8                                                     | 10                                                               |
| B - 14   | 15                                      | 18                                                    | 20                                                               |
| C - 12   | 20                                      | 25                                                    | 25                                                               |
| 10       | 25                                      | 30                                                    | 35                                                               |
| 8        | 35                                      | 40                                                    | 50                                                               |
| 6        | 50                                      | 60                                                    | 70                                                               |
| 4        | 70                                      | 85                                                    | 90                                                               |
| 2        | 90                                      | 110                                                   | 125                                                              |
| 1        | 100                                     | 120                                                   | 150                                                              |
| 0        | 125                                     | 150                                                   | 200                                                              |
| 00       | 150                                     | 180                                                   | 225                                                              |
| 000      | 175                                     | 210                                                   | 275                                                              |
| 0000     | 225                                     | 270                                                   | 325                                                              |

(1) The type of insulation used in homes and buildings.

(2) Special type of insulation for special purposes.

(3) Outside weather proof wire, fire proof insulation or bare conductors.

A - Used for fixtures, portable lamps, and small appliances.

B - Was used for house wiring; use for only lighting and low wattage appliance circuits.

C - Use for appliance circuits, living room lighting and other heavily used circuits.